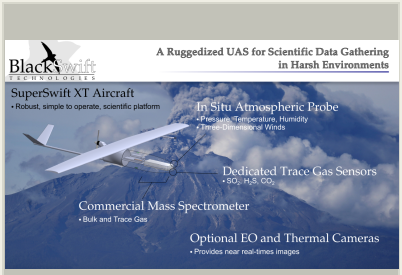
Small Business Innovation Research/Small Business Tech Transfer

A Ruggedized UAS for Scientific Data Gathering in Harsh Environments, Phase I

Completed Technology Project (2016 - 2016)

Project Introduction

Accurate predictive modeling of certain atmospheric chemical phenomena (i.e. volcano plumes, smog, gas clouds, wildfire smoke, etc.) suffers from a dearth of information, largely due to the fact that the dynamic qualities of the phenomenon evade accurate data collection. In situ measurements are currently made through the use of ground sensors and dropsondes. ?Ground sensors, such as seismometers, tiltmeters, in-ground gas monitors and near-field remote sensings instruments[,]? have limited measurement density and provide only information about atmospheric boundary conditions. Dropsondes can provide measurements over the entire vertical profile, but are limited to sampling over a small time period. In situ measurements can be augmented with satellite-based remote sensing systems, such as ASTER, MODIS, AIRS and OMI, however, satellite-based data suffers from its relatively small spatial density and limited frequency of measurement. A need exists for additional targeted in situ data from volcanic ash clouds, particularly to assess ...particle size distribution, ash cloud height, and ash cloud thickness including spatial (horizontal and vertical) and temporal variability of ash concentration. The proposed innovation, the SuperSwift XT, will meet NASA's need to enhance [the] performance and utility of NASA's airborne science fleet by providing a durable, terrain-following UAS that will be adapted for use in harsh environments containing environmental phenomena that impacts societal activity (i.e. volcanic emissions impacting the safety of passenger aviation). The sUAS will provide targeted, in situ observations from previously inaccessible regions that can significantly advance NASA?s goal of safe, efficient growth in global aviation by aiding in the collection of scientific data from which predictive Volcanic Ash Transport and Dispersion models (VATD) used to inform air traffic management systems.



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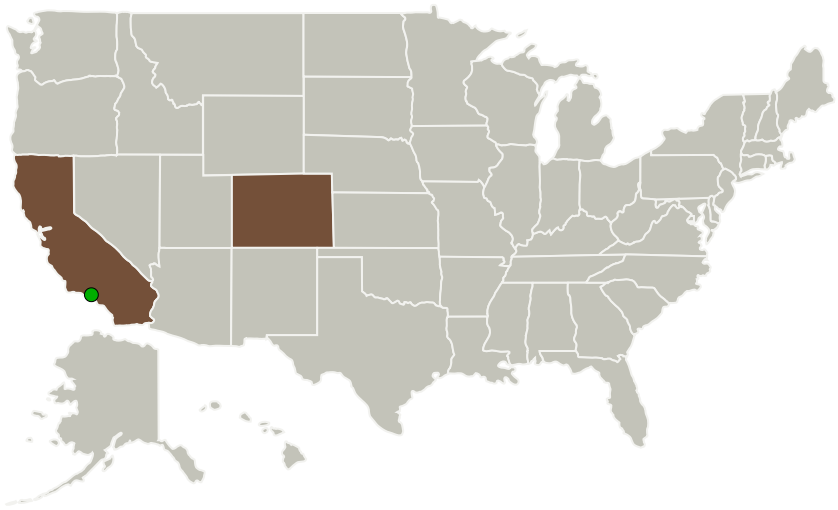
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Black Swift Technologies, LLC	Lead Organization	Industry	Boulder, Colorado
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Colorado

Project Transitions

June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139860)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Black Swift Technologies, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

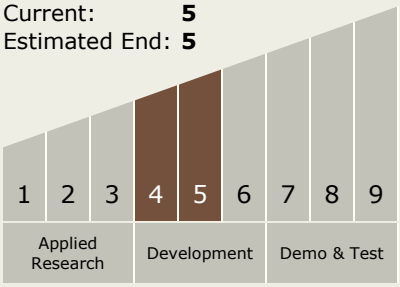
Carlos Torrez

Principal Investigator:

Jack S Elston

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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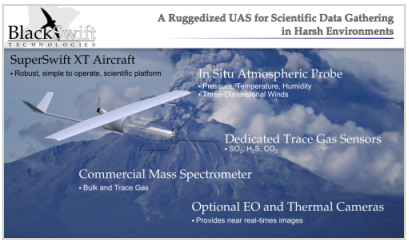
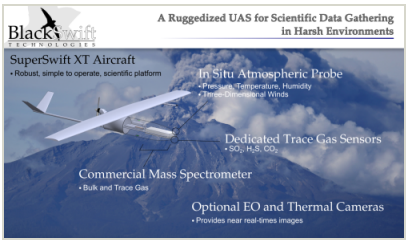
Images



Briefing Chart Image
A Ruggedized UAS for Scientific Data Gathering in Harsh Environments, Phase I
(https://techport.nasa.gov/image/133555)



Final Summary Chart Image
A Ruggedized UAS for Scientific Data Gathering in Harsh Environments, Phase I Project Image
(https://techport.nasa.gov/image/135951)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System